CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2023

DateRun: 07/20/2023

Experimenters: Amelia Wagner

ClientType: Tool Manufacturer

ProjectNumber: Project #2

Substrates: Steel

PartType: Coupon

Contaminants: Adhesive, Resins/Rosins

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To find an effective solvent or aqueous cleaner to remove varnish from steel coupons

Experimental Procedure: Three steel coupons were used for each cleaner tested, for a total of nine coupons. Initial weights of coupons were taken. The varnish was heated to 350 F on a hot plate. Each coupon was placed on the hot plate for a total of 30 seconds. The varnish was then applied to the heated coupons with a metal scraper in order to achieve a thin layer of varnish on the bottom third of the coupons. Once the varnish had solidified, dirty weights of each coupon were taken. Coupons were then subjected to 30 minutes of heated ultrasonics at 120F . The chosen solvents/cleaners tested were A. Dimethyl Glutarate 98.5% (solvent), B. SC Actisolv Safety Solvent 100% (solvent), C. Mirachem 500 100% (aqueous). Coupons were removed and left to air dry. Clean weights were then taken.

Results:

Cleaner	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG
Dimethyl Glutarate 98.5%	0.0304	0.0173	43.09	70.52
	0.0245	0.0045	81.63	
	0.0767	0.0101	86.83	
SC Acitsolv Biobased Safety Solvent 100%	0.0119	0.0024	79.83	78.27
	0.0324	0.0080	75.31	
	0.0059	0.0012	79.66	
Mirachem 500 100%	0.1110	0.0280	74.77	67.21
	0.0923	0.0410	55.58	
	0.0456	0.0131	71.27	

For all solvents/cleaners: Most of varnish was removed within the 30 minute time frame, however some patches of varnish remained on the coupons

Summary:

Conclusion: Dimethyl Glutarate 98.5% and SC Actisolv Biobased Safety Solvent 100% are relatively effective in removing varnish from steel coupons with 30 minutes of heated ultrasonics at 120F. Mirachem 500 100% shows promise with increased temperature.